Consumers' willingness to pay for food safety: the case of mycotoxins in milk

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Abstract

European statistics show that one of the most widespread source of health risks related to food is mycotoxins. The objective of this paper is to evaluate the Italian consumers' perception of the mycotoxins' risk and, more specifically, their willingness-to-pay (*WTP*) *for a hypothetical bottle of milk obtained by cows in which the feed ration contains maize certified for the 'good practices' that reduce such risk. For this purpose, a web-based stated choice* (*SC*) *experiment involving a representative sample of 973 Italian consumers has been carried out and WTP has been measured using the panel data version of a Random Parameters Logit* (*RPL*) *model. The results show that Italian consumers are willing to pay a rather high average price premium for "reduced-micotoxin" milk. This premium becomes even higher for female, middle-age and low-education consumers.*

Keywords: *Food safety; Mycotoxins; Willingness to pay; Mixed logit*

JEL classification: C35, D12

1. Introduction

Food safety is one of the most relevant drivers of consumers' food demand. When food products are perceived as unsafe, their demand drops, and experience also indicates that recovering may be slow. We have been experiencing this phenomenon for many years, following a widespread surging of food crises and hazards (BSE crises, avian influenza, dioxin in meat, foodborne pathogens, etc.). Public institutions have been producing a large effort to control food safety through regulation mechanisms: in the European Union (EU), the European Food Safety Authority (EFSA) has been set up in 2002 as the central agency 'to improve EU food safety, ensure a high level of consumer protection and restore and maintain confidence in the EU food supply'. Furthermore, the Common Agricultural Policy (CAP) places a high value on food safety, as a public good produced by a multifunctional agriculture, and in the future support to agriculture could be heavily linked to such issues: in a recent survey among European citizens, 59% of the interviewed people consider a CAP priority to ensure quality and safe food. On the other hand, since consumers place a value on food safety, there may also be private incentives in controlling for food safety. A better understanding of consumers' risk perception and valuation will thus help both private firms and public agencies in taking actions to favour food safety.

For dealing with food safety issues and food-related risks, since 1979 the EU has been managing the Rapid Alert System for Food and Feed (RASFF) as a tool to exchange information about measures taken as a response to serious risks detected in food or feed products. The annual RASFF report provides statistics on notifications by EU member states concerning detection, in their own territory or at EU borders, of potential health risks related to food and feed. In recent years, the largest number of notifications in terms of hazard categories has always been related to mycotoxins: in 2008, (RASFF, 2008), almost 30% of total notifications to the RASFF (i.e. 932 out of 3139). While most of them come from border rejections of nuts, nut products and seeds, some of them (around 60 in 2008) refer to cereals, cereal products and animal feed.

Mycotoxins are naturally occurring metabolites produced by certain species of moulds (e.g. Aspergillus spp, Fusarium spp) which develop at high temperatures and humidity levels and may be present in a large number of foods. The mould may occur on the growing crop or after harvesting during storage or processing. Whilst moulds can be considered as plant pathogens, the ingestion of the toxin can result in disease in animals and humans. Mycotoxins like aflatoxins and ochratoxin A are known to be carcinogenic. What makes mycotoxins dangerous for human health is that they cannot be destroyed neither by ingestion (for example by animals) nor by cooking practices: if they are present in the raw material, they pass virtually unchanged in the final food preparation. Risk related to mycotoxins in cereals may be higher when the growing season is hot and humid, thus being a source of health concerns; among them, one of the most relevant is the presence of aflatoxins in maize, since maize is largely used in animal feeding, and especially in cow feeding, and thus aflatoxins developed in maize can pass unchanged to widely consumed products like milk and dairy products.

This is what happened in Italy in 2003, when very high concentrations of M1 aflatoxins were detected in milk bottles as well as in Grana Padano, one of the most famous Italian Protected Denomination of Origin (PDO) dairy product. As a response, a specific working group was created and a relevant wave of agronomic and technological research has been carried out in order to find ways of reducing the risk of aflatoxins in maize. The result of these studies is a set of “good practices” concerning all the steps of the maize and feed supply chain (crop growing, harvesting, storage, processing), with a key role played by maize farmers. Applying this set of good practices clearly implies additional costs for farmers and feed processors, that may result in an increase of the average retail prices of milk and dairy products. Thus, one of the concerns of the maize and feed industry, but also of the dairy industry, is whether an informed consumer may be willing to pay a higher price for milk and dairy products obtained by animals fed with “good practice” maize. Of course, for producers controlling for food risks, this can also reduce the risk of liability in the case of health consequences for consumers.

In this paper, we attempt to investigate the consumers' perception and valuation of mycotoxins' risk in food; for this purpose the willingness-to-pay (*WTP*) of Italian consumers' for reducing the risk of mycotoxins for a hypothetical bottle of milk obtained by cows in which the feed ration contains maize certified for the 'good practices' has been evaluated using a stated choice (SC) experiment. In the summer of 2009 a web-based survey administered by Lightspeed Research Ltd., a market research company specialised in online surveys, has been carried out on a representative sample of 973 Italian consumers. *WTP* has been measured using the panel data version of a Random Parameters Logit (RPL) model (Train, 2003).

2. The theoretical framework

Food safety attributes can be interpreted as a food 'characteristic'; goods' characteristics can be evaluated using discrete choice models, where choices are made among mutually exclusive finite alternatives within an exhaustive choice set. Discrete choice models rely on the Lancaster's consumer theory (Lancaster, 1966), where goods are considered as a bundle of characteristics, and consumers' preferences are stated over characteristics. McFadden (1974) proposed the econometric framework for discrete choice analysis in the context of random utility models. For an individual *i* the (indirect) utility obtained by a good j , U_{ij}, can be decomposed in a deterministic part, V_{ij}, related to the *K* observed good's characteristics (including price), and in a stochastic part, ε_{ij}, accounting also for unobserved variables:

$$U_{ij} = V_{ij} + \varepsilon_{ij} = \sum_k x_{jk}\beta_{ik} + \varepsilon_{ij} \qquad (1)$$

where x_{jk} is the level of attribute *k* in good *j* and β_{ik} is the individual preference parameter for the k^{th} characteristic (i.e., the deterministic part of individual utility is a linear function of product's characteristics). The choice rule is utility maximization: therefore good *j* is chosen among all alternatives iff:

$$U_{ij} \geq U_{ih} \qquad \forall\, h \neq j \qquad (2)$$

Different assumptions on the structure of the stochastic component will lead to different models. In the so-called Mixed Logit (ML) model the stochastic part ε_{ij} is decomposed as $\varepsilon_{ij} = \eta_{ij} + u_{ij}$, where η_{ij} is an additive random term that can be related to attributes and alternatives and can account for correlation and heteroscedasticity, while the u_{ij} term is an i.i.d. random component with an extreme value distribution. In our study, we have employed the RPL, where the ML specification is

obtained by allowing the set of preference parameters β_i to be distributed across individuals according to a statistical distribution, $\beta_i \sim f\left(\beta_i \middle| \beta, \sigma_\beta\right)$, characterized by mean β and standard deviation σ_β. As it is well known, the RPL model is becoming the standard reference for SC studies, because of its ability in taking into account preference heterogeneity and its flexibility in accommodating a variety of model specifications (McFadden and Train, 2000).

Then, the (conditional) probability that individual *i* will choose alternative *j* is given by:

$$P_i\left(j\middle|\beta_i\right) \equiv L_{ij}\left(\beta_i\right) = \frac{e^{V_{ij}\left(\beta_i\right)}}{\sum_h e^{V_{ih}\left(\beta_i\right)}} \tag{3}$$

and by integrating the conditional probability we obtain the probability of choosing alternative *j*:

$$P_i\left(j\right) = \int L_{ij}\left(\beta_i\right) f\left(\beta_i \middle| \beta, \sigma_\beta\right) \mathrm{d}\beta \tag{4}$$

The RPL-ML specification does not exhibit the independence of irrelevant alternatives (IIA) property, thus it does not restrict substitution patterns as in the simple Logit model; therefore, the ratio of probability of choices between two alternatives, *j* and *h*, depends also on attributes and alternatives other than *j* and *h*. Furthermore, the RPL-ML specification can be also generalized to panel data (i.e. each sampled individual *i* makes more than one choice), by simply assuming that parameters are constant over some time periods/choices.

In order to evaluate the consumers' *WTP* for product attributes, consider that in the random utility model each preference parameter represents the marginal utility of the attributes, that is $\partial u / \partial x_k = \beta_k$. Thus, the *WTP* for any attribute *k* is given by the negative of the ratio between the marginal utility of the attribute *k* and the marginal utility of money:

$$WTP = -\frac{\beta_k}{\beta_{price}} \tag{5}$$

Given that the preference parameters are distributed across individuals and each individual will make *T* repeated choices, the individual average WTP will be computed as:

$$WTP_i = -\frac{\frac{1}{T}\sum_t \frac{-\beta_{ik}}{\beta_{i,price,t}} L\left(\beta_{it}\right)}{\frac{1}{T}\sum_t L\left(\beta_{it}\right)} \tag{6}$$

and the estimate of the *WTP* will be obtained by averaging WTP_i across individuals.

3. Stated choice (SC) experiment and survey

In a SC experiment individuals are requested to choose among hypothetical alternatives. When products characteristics are not available (i.e. new products) a SC experiment is the only available approach to investigate consumers' preferences. A number of applications of this model in SC agricultural and food marketing studies have been recently made available (see, among others, Lusk et al, 2003; Alfnes, 2004; Rigby and Burton, 2005).

To evaluate consumers' perception of mycotoxins' risk in milk, in July 2009 a SC experiment on a representative sample of 973 Italian consumers was conducted through a web-based survey administered by Lightspeed Research Ltd.. The survey started with a statement describing mycotoxins, their potential health effects and the role of some "good practices" in reducing the risk of their presence in milk. Then, information concerning consumers' habits in terms of milk purchases was collected (frequency of food shopping, frequency of milk purchase, preferred type of milk, attitude towards mycotoxins' labelling). In the SC experiment, consumers were then asked to choose among different versions of bottled milk in terms of fat content (skimmed, semi-skimmed and whole), heating treatment (UHT, pasteurised and high quality (HQ)) and prices. Among the products entering the choice sets proposed to consumers, we included some *hypothetical* milk products where cows were guaranteed to be fed with "good practices" maize. In table 1 milk attributes and their possible levels are shown. Since to each participant three choice sets were shown, a balanced panel of observations was obtained.

Table 1 – Milk attributes and their levels in the SC experiment

Milk (1 liter)	
Heat-treatment	*fresh-HQ* (high-quality), *fresh-P* (pasteurized), *UHT*
Fat content	*whole*, *semi-skimmed*, *skimmed*
Price (€/l)	1.05, 1.15, 1.25, 1.35, 1.45, 1.53, 1.55, 1.58, 1.63, 1.68, 1.73, 1.78, 1.83, 1.88;
Mycotoxins	*conventional practices* (higher risk), *good practices* (lower risk)

In each of the three choice sets administered, the respondent was asked to choose among three alternatives, the first always being the 'status-quo' alternative (fresh-HQ, whole, 1.58 €/l, conventional practices); all the alternatives have been randomly selected, without replacement, within a set of 13 possible alternatives. The 'status quo' alternative has been kept fixed for all the choice sets and it represents the 'preferred' or 'most common' choice for consumers, and the one to which the modern retailers provide more space in their outlets. An example of a choice set is given in table 2.

Table 2 – Choice set example

Milk (1 liter)	**1**	**2C**	**3C** (hypothetical)
Heat-treatment	fresh-HQ	UHT	fresh-P
Fat content	whole	semi-skimmed	semi-skimmed
Price (€/l)	1,58 €/l	1,15 €/l	1,63 €/l
Mycotoxins	conventional practices	conventional practices	good practices
choice (tick the box)	☐	☐	☐

Then, at the end of the survey, socio-demographic characteristics were collected: age, place, gender, marital status, education level, type of employment, employment position, household's composition, household's income level). In table 3 the characteristics of the sample are summarised.

4. Estimation results and discussion

The RPL model has been estimated using the package NLOGIT 4.0. The set of explanatory variables **x** includes both product attributes and socio-demographics characteristics; randomness is assumed only for attributes' parameters, with the exception of the 'fat content' coefficient, which is assumed to be constant across consumers. A normal distribution is assumed for the parameters related to heat-treatment and 'mycotoxins' risk', and a triangular distribution for the price parameter, whose sign is expected to be negative. Furthermore, only individually significant socio-demographic characteristics have been selected and added to the model, precisely the education level, number of household's members, and number of household' members with less than 16 years. The estimated model is then the following:

$$U_{ij} = \beta_{HT} HT + \beta_{MR} MR + \beta_P P + \beta_{FC} FC + \sum_j \beta_{EL,j} EL_i + \sum_j \beta_{HC,j} HC_i + \sum_j \beta_{HC16,j} HC16 + \varepsilon_{ij} \quad (7)$$

with $\beta_k \sim N(\bar{\beta}_k, \sigma_k)$ for $k = HT, MR$ and $\beta_P \sim tr(0, 2\bar{\beta}_P)$. In table 4, descriptive statistics of variables entering the model are provided.

Table 3 – Socio-demographic characteristics' distribution within the sample

	number of respondents	sample frequency
GENDER		
woman	540	55.50%
man	433	44.50%
AGE		
18-25	87	8.94%
25-34	167	17.16%
35-44	212	21.79%
45-54	178	18.29%
55-64	153	15.72%
65-99	176	18.09%
GEOGRAPHIC AREA		
North-West	254	26.10%
North-East	183	18.81%
Centre	187	19.22%
South	349	35.87%
MILK PURCHASING FREQUENCY		
every day	183	18.81%
more than once a week	389	39.98%
once a week	254	26.10%
once every two weeks	94	9.66%
once a month	53	5.45%
LABELING ON 'GOOD PRACTICES'		
Yes	930	95.58%
No	10	1.03%
Don't know	33	3.39%
MARITAL STATUS		
Married	705	72.46%
Not married	268	27.54%
EMPLOYMENT		
employed	510	52.42%
retired	229	23.54%
housewife	102	10.48%
student	69	7.09%
unemployed	13	1.34%
unemployed, looking for first employment	50	5.14%
EDUCATION LEVEL		
none	28	2.88%
primary school	112	11.51%
secondary (high) school	559	57.45%
bachelor degree	274	28.16%
HOUSEHOLD MEMBERS		
2	343	35.25%
3	310	31.86%
4	247	25.39%
5	60	6.17%
>6	13	1.34%
HOUSEHOLD MEMBERS WITH LESS THAN 16 YEARS		
0	681	69.99%
1	180	18.50%
2	89	9.15%
3	21	2.16%
4	2	0.21%
INCOME LEVEL		
< 10,000 €	60	6.17%
10,000 - 20,000 €	179	18.40%
20,000 - 40,000 €	364	37.41%
40,000 - 70,000 €	164	16.86%
> 70.000 €	30	3.08%
no answer	176	18.09%

Table 4 – Descriptive statistics of included variables

Variable	Mean	Standard deviation
Education Level (***ED***)	2.10915	0.706892
Number of Household' Members with less than 16 Years (***HC16***)	0.440904	0.763987
Number of Household's Members (***HC***)	3.06783	0.996207
Heat-Treatment (***HT***)	0.818088	0.871561
Fat Content (***FC***)	1.63755	0.578033
Mycotoxins' Risk (***MR***)	0.458376	0.498344
Price (***P***)	1.54496	0.209624

ED: none=0, primary school=1, high school= 2, bachelor degree=3
HT: fresh-HQ=0, fresh-P=1, UHT=2
FC: skimmed=0, semi-skimmed=1, whole=2
MR: conventional practices=0, good practices=1

Estimated parameters, standard errors and p-values of the RPL model are presented in table 5 and 6. In table 5 estimates related to product attributes are given, while in table 6 parameters related to socio-demographic characteristics of individuals, for each of the 13 alternatives relatively to the 'status quo' product, are provided.

Table 5 – Estimated parameters for product attributes for the RPL model

Variable	parameter	standard error	*p*-value
Price	- 3.7328	1.71501	0.029514
Std. Dev. of Price	3.83969	1.58392	0.015344
Heat Treatment	-0.1013	0.457989	0.824954
Std. Dev. of Heat Treatment	3.16664	0.334655	2.89E-15
Mycotoxins' Risk	1.84058	0.619068	0.002948
Std. Dev. of Mycotoxins' Risk	2.50222	0.214553	2.89E-15
Fat Content	-0.22692	0.26697	0.395334

The price parameter, with the expected negative sign, and its standard deviation are significant at the 5% level. Thus, price response is heterogenous across consumers. Similarly, the parameter related to the mycotoxins risk is significant (at the 1% level) and positive: thus a reduction in the mycotoxins' risk (that is an increase in the variable *MR*) will positively affect the probability of choosing an alternative carrying that characteristic; also its standard deviation is significant. On the other hand, the estimated parameters for heat-treatment and fat content are not significant, on average, although at least for the consumers' attitude towards heat treatment there is heterogeneity across individuals.

Table 6 – Estimated parameters for socio-demographics characteristics for the RPL model

variable	parameter	standard error	*p*-value
fresh-P, semi-skimmed, 1.53 €/l, conventional practices			
ED	0.168139	0.284385	0.554361
HC16	0.044344	0.301977	0.883253
HC	0.120554	0.230417	0.600837
UHT, whole, 1.25 €/l, conventional practices			
ED	0.241068	0.285953	0.399209
HC16	-0.21064	0.340477	0.536149
HC	0.267173	0.225194	0.23546
UHT, semi-skimmed, 1.15 €/l, conventional practices			
ED	-0.38068	0.281359	0.176056
HC16	0.424578	0.363289	0.242522
HC	-0.12188	0.22344	0.585429
UHT, skimmed, 1.05 €/l, conventional practices			
ED	0.00791	0.306175	0.979389
HC16	0.068461	0.376477	0.855704
HC	-0.00952	0.26006	0.970793
fresh-HQ, whole, 1.68 €/l, good practices			
ED	-0.45854	0.327746	0.16179
HC16	-0.01906	0.351285	0.956738
HC	-0.18223	0.256698	0.477763
fresh-HQ, whole, 1.78 €/l, good practices			
ED	0.281202	0.290846	0.333623
HC16	0.139978	0.325071	0.666753
HC	0.049587	0.239388	0.835901
fresh-HQ, whole, 1.88 €/l, good practices			
ED	0.187461	0.300213	0.532349
HC16	0.198947	0.36279	0.58343
HC	0.176647	0.245048	0.47099
fresh-P, semi-skimmed, 1.63 €/l, good practices			
ED	0.137612	0.295561	0.641504
HC16	0.217655	0.35825	0.543485
HC	0.147534	0.24282	0.543462
fresh-P, semi-skimmed, 1.73 €/l, good practices			
ED	0.339337	0.26203	0.19531
HC16	0.027016	0.317644	0.93222
HC	0.183974	0.218786	0.400412
fresh-P, semi-skimmed, 1.83 €/l, good practices			
ED	0.393117	0.245273	0.108985
HC16	-0.0126	0.28007	0.964107
HC	0.167927	0.188722	0.373566
UHT, whole, 1.35 €/l, good practices			
ED	0.453071	0.242592	0.061814
HC16	0.024114	0.298302	0.935572
HC	0.131724	0.187065	0.481332
UHT, whole, 1.45 €/l, good practices			
ED	0.312966	0.240869	0.193834
HC16	-0.15471	0.292645	0.597036
HC	-0.2474	0.196753	0.208613
UHT, whole, 1.55 €/l, good practices			
ED	0.041984	0.237558	0.859719
HC16	-0.17338	0.290582	0.550727
HC	0.01557	0.185293	0.933034

In table 6 parameters' estimates for socio-demographic characteristics are reported, for each of the 13 alternatives. As we said, socio-demographic variables were selected according to their individual significance; however in the final estimated model, they are substantially not significant, indicating that socio-demographic differences are not responsible for the consumers' choice (i.e. individual heterogeneity is captured by the stochastic structure of the model, and socio-demographic differences do not add information).

The focus of the paper is the evaluation of consumers' attitude towards mycotoxins' risk; to this extent the *WTP* has been computed. From our model, given the assumption of randomness of the *MR* parameter, we can compute a *WTP* for each of the individuals in the sample, according to the formula in (6). However, in table 7 the average *WTP* is reported: the price premium that consumers are willing to pay to obtain a product with a reduced mycotoxins' risk is, on average, 0.64 €/l, which is 41.5% of the average milk price (1.54 €/l).

The *WTP* for different socio-demographic characteristics is also given in table 7. As it is often the case, women are more willing to pay for risks' reduction than men (0.70 €/l vs. 0.56 €/l), while people between 45-54 years show the highest *WTP* (0.77 €/l) when the sample is segmented by age. Consumers with the highest milk purchasing frequency, thus the 'heavy consumers', show the highest WTP (0.74 €/l): milk purchasing frequency positively impact on *WTP*. Housewives and students are the more mycotoxins-concerned groups, while in terms of education level we do not have strong variability in *WTP*, although it appears that WTP may decrease with higher levels of education. People in the North-Western part of the country are the least concerned (0.54 €/l), while those in the North-East show the highest *WTP* (0.72 €/l). Considering the income level, 'poor people' present the lowest *WTP*, but there is not a clear correlation between income level and *WTP*. Also, we expected that the presence of family members with less than 16 years would impact consumers' *WTP*: however, this is not clearly supported by our sample results. Finally, in our sample there is a group of people not interested in mycotoxins' risk labeling (they represent only 1% of the sample) and they in fact show the lowest *WTP* (0.14 €/l).

Thus, estimates of *WTPs* for milk with a reduced risk in mycotoxins show very high values, with a 40% price premium on average. Some reasons may explain this result. First of all, some hypothetical bias is likely to be present, as it is the case in may SC experiment; thus people are willing to pay higher price premiums when 'hypothetical' and not real money is involved.

Table 7 – Socio-demographics and consumers' *WTP* for reduce Mycotoxins' Risk

		WTP
	SAMPLE AVERAGE	**0.64**
GENDER	*woman*	0.70
	man	0.56
AGE	*18-25*	0.68
	25-34	0.57
	35-44	0.62
	45-54	0.77
	55-64	0.68
	65-99	0.54
MILK PURCHASING FREQUENCY	*every day*	0.74
	more than once a week	0.66
	once a week	0.61
	once every two weeks	0.60
	once a month	0.42
GEOGRAPHIC AREA	*North-West*	0.54
	North-East	0.72
	Centre	0.67
	South	0.65
LABELING ON 'GOOD PRACTICES'	*Yes*	0.66
	No	0.14
	Don't know	0.20
EDUCATION LEVEL	*none*	0.68
	primary school	0.69
	secondary (high) school	0.64
	bachelor degree	0.63
EMPLOYMENT	*employed*	0.68
	retired	0.51
	housewife	0.72
	student	0.74
	unemployed, looking for first employment	0.40
	uenmployed	0.61
MARITAL STATUS	*married*	0.62
	non married	0.68
HOUSEHOLD MEMBERS	*2*	0.62
	3	0.63
	4	0.64
	5	0.61
	6	1.62
	7	0.60
	8	0.25
HOUSEHOLD MEMBERS (LESS THAN 16 YEARS)	0	0.65
	1	0.62
	2	0.67
	3	0.57
	4	0.90
INCOME LEVEL	< 10.000 €	0.50
	10 - 20.000 €	0.84
	20 - 40.000 €	0.61
	40 - 70.000 €	0.68
	>70.000 €	0.60

Further, mycotoxins' are not well known by the general public, and they represent a quite new problem for the very large part of the individuals in the sample. In the first part of the questionnaire administered during the survey a description was provided, indicating that '…mycotoxins are highly resistant to chemical and physical agents. They can be ingested through a variety of food products and give serious damages…their main effects on human people include death, inhibition of the immune system e development of cancer'. Although some indication about weather conditions that can be responsible for the problem are given, it is likely that the perceived risk was higher than the actual risk, thus *WTP* levels account for it.

Another issue, related again to the limited knowledge of mycotoxins' risk, is that the corresponding variable may pick up not only consumers' concern toward the specific risk but can be considered as a 'proxy' variable for a 'safe product', and thus the computed *WTP*s may just represent the premium that consumers are willing to pay for a 'safer milk', thus confirming that modern consumers are highly sensitive to food safety issues.

5. Concluding remarks

European statistics show that one of the most widespread source of health risks related to food is mycotoxins. In this paper, we have evaluated the Italian consumers' perception of the mycotoxins' risk and, more specifically, their willingness-to-pay for a hypothetical bottle of milk obtained by cows in which the feed ration contains maize certified for the 'good practices' that reduce such risk. For this purpose, a web-based stated choice experiment involving a representative sample of 973 Italian consumers has been carried out and WTP has been measured using the panel data version of a Random Parameters Logit model. The results show that Italian consumers are willing to pay a rather high average price premium (+41.5%) for "reduced-micotoxin" milk and this premium becomes even higher for female, middle-age and low-education consumers.

Despite this rather clear outcome in terms of food safety concerns, our work carries some limitations. Since mycotoxins are not well-known to the general public, the description of the health risks provided in the questionnaire may have generated a perceived risk higher than the actual risk. Moreover, for the same reason, consumers may consider the "good practices" as a general proxy for safer food, not specifically related to mycotoxins, and their WTP may indicate a global premium for "safer milk". But, in general, the most important limitation of this study is likely to be related to the so called "hypothetical bias", a persistent problem in SC experiments, since people tend to be more willing to spend their money when asked hypothetical questions than when they are forced to pay real

money as a consequence of their choices. Several papers have recently suggested methods for reducing hypothetical bias (see Alfnes et al, 2010 and the literature cited there) and any study analysing the consumers' *WTP* for food safety characteristics, or, more generally, the potential *WTP* for a "new product", should apply these techniques.

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